

PROCEDURE 21 - Laser Operations

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Synopsis

The purpose of this procedure is to establish requirements relative to the hazards associated with laser operations. The procedure applies to all NWS facilities, work locations, and employees. Although this procedure covers safety practices applicable to Class 1, 2, 3a, 3b and 4 lasers, it should be noted that the NWS operations do not currently employ Class 3b and 4 lasers or laser systems.

Initial Implementation Requirements:

- **Analyze Site Operations versus Procedure Requirements**
 - Review all lasers prior to operation (21.3.5)
 - Baseline Eye Examination (If required) (21.3.10)
- **Develop/Request Documentation/Information required for Site**
 - Develop Laser Inventory (21.3.9)
 - Request Manufacturer's Instructions for all Laser systems.(21.3.1)
- **Designate Person to administer Laser Operations Procedure Requirements**
- **Provide Local Training of Site Personnel**
 - Training of site personnel on Laser Safety. (21.3.7, 21.3.8)
- **Inventory Material/Equipment**
 - Laser Systems and Devices (21.3.9)

Annual Review and Recurring Task Requirements:

- **Review/Update Documentation/Information required for Site**
 - Maintain Laser Inventory (21.3.9)
- **Provide Refresher Training of Site Personnel**
 - Refresher Training of site personnel on Laser Safety. (21.3.7, 21.3.8)
- **Conduct Employee Examinations**
 - Annual Eye Examination (If required) (21.3.10)

Laser Operations Checklist

Requirements	Reference	YES	NO	N/A	Comments
Is initial and annual review of this procedure conducted and documented?	21.4.2				
Is there a current inventory of all lasers or laser systems at this facility?	21.3.9				
Have all laser systems (except Class 1) been approved by the Safety or Environmental/Safety Focal Point or his/her designee prior to operation?	21.3.5				
Have personnel who work routinely with or around laser systems been provided with safety training?	21.3.7 21.3.8				
Are copies of Manufacturer's Instructions for laser systems maintained and kept on file?	21.3.1				
Have any laser operators of Class 3b and 4 laser systems received annual eye examinations?	21.3.10				

21 LASER OPERATIONS

21.1 Purpose and Scope

As part of its goal to provide a safe and healthful workplace, the National Weather Service (NWS) is promulgating this procedure related to hazards associated with laser operations. Although this procedure covers safety practices applicable to Class 1, 2, 3a, 3b and 4 lasers, it should be noted that the NWS operations do not currently employ Class 3b and 4 lasers or laser systems.

21.2 Definitions

ACGIH. American Conference of Governmental Industrial Hygienists.

ANSI. American National Standards Institute.

Class. The unit of laser hazard classification. Lasers are rated (in order of lowest to highest class) Class 1, 2a, 3a, 3b, and 4 as defined by ANSI Z136.1-2000. Class 1 lasers are considered to be incapable of producing damaging radiation levels during operation and are, therefore, exempt from any control measures or other forms of surveillance. An example of a Class 1 laser is the ASOS Ceilometer. Class 2 lasers are visible light lasers that could produce excessive exposures if viewed for more than the 0.25 second response time of the aversion reflexes. Class 3 lasers may be hazardous under direct and specular reflection viewing conditions, but the diffuse reflection is usually not a hazard. Class 4 lasers pose hazards to the eyes and skin, and can be also a fire hazard.

Field Office. A Field Office may include the following: Weather Forecast Office (WFO), River Forecast Center (RFC), Weather Service Office (WSO), and a Data Collection Office (DCO).

Laser System. An assembly of electrical, mechanical and optical components which included a laser.

MPE. Maximum Permissible Exposure is a level of laser radiation to which a person may be exposed without hazardous effect or adverse biological changes in the eye or skin. Commercial laser products are manufactured to meet MPE levels.

Operating Unit. For the purpose of this procedure, Operating Unit includes the National Centers for Environmental Prediction (NCEP), National Data Buoy Center (NDBC), NWS Training Center (NWSTC), National Reconditioning Center (NRC), Radar Operations Center (ROC), or the Sterling Research & Development Center (SR&DC).

Protective Housing. An enclosure surrounding the laser or laser system that prevents the access to laser radiation above the applicable MPE level.

Station Manager. For the purpose of this procedure, the Station Manager shall be either the NWS Regional Director; Directors of Centers under NCEP (Aviation Weather Center, NP6; Storm Prediction Center, NP7; and Tropical Prediction Center, NP8); Directors of the NDBC, NWSTC, and Chiefs of NRC, ROC and SR&DC facilities; or Meteorologist in Charge (MIC), Hydrologist in Charge (HIC), or Official in Charge (OIC).

21.3 Procedure

- 21.3.1 The manufacturer's instructions for safe operation of lasers and laser systems should be used by personnel.
- 21.3.2 Engineering controls such as protective housing (all classes of lasers) , interlock system (Class 3b and 4 lasers), and warning labels (all classes except Class 1) shall be supplied by manufacturer of laser products. Engineering controls shall be in accordance with ANSI Z136.1-2000 standard.
- 21.3.3 Administrative and procedural controls such as instructions that specify rules and/or work practices implementing or supplementing engineering controls shall be established only for Class 3b and 4 lasers or laser systems.
- 21.3.4 Written standard operating procedures are required for Class 3b and 4 lasers or laser systems.
- 21.3.5 All lasers used at NWS facilities (with exception of Class 1 lasers) shall be approved by the Safety or Environmental/ Safety Focal Point or his/her designee prior to operation of the laser.
- 21.3.6 Requirements listed in NWS Handbook 11, "Technical Information Package, Automated Surface Observing System" for Class 1 lasers shall be followed including the following practice:
 - Never look directly into operating lasers, particularly with magnifying glasses or binoculars.*
- 21.3.7 Training shall be provided to each employee working routinely with or around Class 3b and 4 lasers. Commercially available safety guide literature, audio/video or computer based instruction or short-term classroom course on laser safety are recommended.
- 21.3.8 Training should be provided to employees working with Class 2 and 3a lasers or laser systems (e.g., laser pointers and hand-held barcode scanners) to educate employees against the misuse of the laser products. Attachment A contains information that may be provided for education of laser pointer users.
- 21.3.9 The Safety or Environmental/Safety Focal Point shall maintain a current inventory of lasers (with exception of Class 1 lasers) at the facility.
- 21.3.10 Laser operators (Class 3b and 4 lasers) who have potential for hazardous eye exposure to laser beams shall have a baseline eye examination prior to contact with laser equipment. In addition, annual eye examinations shall be conducted by qualified medical personnel for those employees. Records of these examinations shall be maintained by the medical staff or human resources for the duration of an employee's employment plus an additional 30 years.

21.4 Quality Control

21.4.1 Regional or Operating Unit Environmental/Safety Coordinators

- a. Shall perform an annual assessment of the regional headquarters facilities or operating unit to monitor and promote compliance with the requirements of this procedure.
- b. Shall perform assessments or designate personnel to perform assessments of all field offices to monitor and promote compliance with the requirements of this procedure every two years.

21.4.2 Station Manager

Shall review, or delegate review, of this procedure on an annual basis to ensure that the facility is complying with its requirements. Confirmation of this review shall be forwarded to the Regional or Operating Unit Environmental/Safety Coordinator.

21.4.3 NWS Headquarters (NWSH)

- a. The NWS Safety Office shall perform an annual assessment of the NWSH facilities to ensure that the facilities are in compliance with this procedure.
- b. The NWSH Safety Office shall periodically perform an assessment of the regional headquarters and field offices to ensure compliance with this procedure. The frequency of these regional and field office assessments shall be determined by the NWSH Safety Office.
- c. Requests for clarification concerning this procedure shall be directed to the NWSH Safety Office.

21.5 Responsibilities

21.5.1 Regional or Operating Unit Environmental/Safety Coordinators*

Shall monitor and coordinate to promote compliance with the requirements of this procedure for the regional headquarters, and field offices or operating units.

21.5.2 Station Manager*

Shall have oversight over the implementation of this procedure, and ensure that the requirements of this procedure are followed by individuals at the NWS facility.

21.5.3 Safety or Environmental/Safety Focal Point*

Shall ensure that any responsibilities delegated to them by the Station Manager are implemented in accordance with the requirements of this procedure.

21.5.4 Employees

- a. Individual employees affected by this procedure are required to read, understand and comply with the requirements of this procedure.

- b. Report unsafe or unhealthful conditions and practices to their supervisor or safety focal point.

NOTE: * - Reference NWS PD 50-11 for complete list of responsibilities
<http://www.nws.noaa.gov/directives/050/pd05011a.pdf>

21.6 References

Incorporated References. The following list of references is incorporated as a whole or in part into this procedure. These references can provide additional explanation or guidance for the implementation of this procedure.

- 21.6.1 American National Standards Institute, ANSI Z136.1-2000, "Safe Operation of Lasers."
- 21.6.2 National Safety Council, Fundamentals of Industrial Hygiene, Fourth Edition.
- 21.6.3 National Weather Service Engineering Handbook 11, "Technical Information Package, Automated Surface Observing System."
- 21.6.4 U.S. Department of Labor, Occupational Safety and Health Administration,
21 CFR Parts 1000 and 1040, "Laser Products."

21.7 Attachments

Attachment A. Laser Pointer Safety Information

ATTACHMENT A

Laser Pointer Safety Information

Commercial laser pointers are most commonly designed to assist speakers when giving lectures or business presentations. A high-tech alternative to the retractable, metal pointer, the laser pointer beam will produce a small dot of light on whatever object at which it is aimed. It can draw an audience's attention to a particular key point in a slide show. The majority of laser pointers are Class 3a products and are required to have "DANGER" warning logotype.

There have been increasing numbers of laser pointer incidents reported concerning misuse of these devices. It is important for the users to understand that the nuisance effects of glare or flashblindness can produce potentially dangerous secondary hazards as a result. The following are recommendations published by the Laser Institute of America:

- a. Never shine a laser pointer at anyone. Laser pointers are designed to illustrate inanimate objects.
- b. Do not allow minors to use a pointer unsupervised.
- c. Laser pointers are not toys.
- d. Do not point a laser pointer at mirror-like surfaces. A reflected beam can act like a direct beam on the eye.
- e. Do not purchase a laser pointer if it does not have a caution or danger sticker on it identifying its class. Report suspicious devices to the U.S. Food and Drug Administration.

